EXHIBIT 4
DATE Jan 28, 2011
HB 6

DNRC Project # 52

Project Name: Tuscor Creek Restoration Project

Project Sponsor: Green Mountain Conservation District

Tuscor Creek is a tributary to the Lower Clark Fork River in Sanders County, Montana. The goal of this project is to restore channel, streambank and floodplain function in the lower reach of the creek to protect and improve aquatic resources. We have been asked to discuss the risks associated with the alternative method we have selected for addressing the severely aggraded and degraded reaches of lower Tuscor Creek where large volumes of sediment are being produced and headcutting and bank erosion are greatly altering stream health and function.

In-stream method selected (step-pool grade controls):

There were a number of alternatives, the most secure of which provided complete control over a re-engineered channel, with the ability to manage the geometry, channel materials, and revegetation. Given the expense of such an endeavor, the cost-benefit ratio of working with the existing channel exceeds the risks, which, in our opinion, is inherent to any revegetation or stabilization effort.

Since the channel and banks will require some additional survey prior to permitting, any specific areas of concern with reference to lateral erosion can be supported relatively simply with locally available woody material. The vertical stability of the channel is supported over the lower half of the project by a base clay stratum, which is not a highly erodible substrate. Also, much of the lower portion of the channel, where the incision is most pronounced, has already widened to the point of developing a floodplain of a C-type form. The upper portion of the project is not as incised, because it has been the most recently-affected reach. As a result, it inherently has more of the appropriate vegetation close to the banks, providing an element of stability on the upland proximal to the channel.

Revegetation method selected:

For our proposed revegetation effort, site specific soil, climate, and landform characteristics provide a unique set of conditions that typically yield a very high revegetation potential and project success. On Tuscor Creek, moving soils and a lack of a seed source inhibit natural plant establishment. However, planted seedlings should grow with vigor – especially alder shrubs. In nearby drainages we see alder reach nearly 6 feet in two growing seasons. Alder alone does little to promote long-term stability, but does enhance site conditions that allow planted tree seedlings to grow with vigor. A well established riparian forest will drastically change the character of Tuscor Creek.

In addition to simple revegetation, we plan to use soil bio-engineering techniques. On Tuscor Creek this will mean vegetated soil lifts, brush bundles and anchored brush bars. This approach used on nearby streams with similar characteristics has been very successful.

Again – this site is unique. The revegetation potential and associated bio-physical resiliency, combined with current physical and ecologic trends are all in our favor and create conditions that will lead to success.